|| Jai Sri Gurudev ||
Sri Adichunchanagiri Shikshana Trust (R)
SJB Institute of Technology
BGS Health and Education City, Dr. Vishnuvardhana Road, Kengeri, Bengaluru-560060
Approved by AICTE, New Delhi.
Autonomous Institute affiliated to Visvesvaraya Technological University, Belagavi
Accredited by NAAC with 'A+'grade, Certified by ISO 9001 - 2015
Recognized by UGC, New Delhi with 2(f) & 12 (B)

Semester:	I/II	**Course Type:**	IESC		
Course Title: Programming in C					
Course Code:	25ITI14/24			**Credits:**	4
Teaching Hours/Week (L:T:P:S)			3:0:2:1	**Total Hours:**	40 +(10-12 lab slots)
CIE Marks:	50	**SEE Marks:**	50	**Total Marks:**	100
SEE Type:	Theory			**Exam Hours:**	3

I. Course Objectives

This course will enable students to:

- Familiarize with writing of algorithms, flowcharts and fundamentals of C.
- Demonstrate the use of different branching and looping statements.
- Use and implement arrays and structures.
- Implement different programs using user defined functions.
- Illustrate and use of recursion and pointers.

II. Teaching-Learning Process (General Instructions)

These are sample Strategies, which teachers can use to accelerate the attainment of the various course Outcomes.

1. Lecturer method (L) need not to be only traditional lecture method, but alternative effective teaching methods could be adopted to attain the outcomes.
2. Use of Video/Animation to explain functioning of various concepts.
3. Encourage collaborative (Group Learning) Learning in the class.
4. Ask at least three HOT (Higher order Thinking) questions in the class, which promotes critical thinking.
5. Adopt Problem Based Learning (PBL),which fosters student's Analytical skills, develop design thinking skills such as the ability to design, evaluate, generalize, and analyze information rather than simply recall it.
6. Introduce Topics in manifold representations.
7. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.
8. Discuss how every concept can be applied to the real world and when that's possible, it helps to improve the student's understanding.
9. Use https://pythontutor.com/visualize.html#mode=edit in order to visualize the operations of C Programs

III.COURSE CONTENT

III(a). Theory PART

Module-1: Introduction to Computer and Programming Basics.	8 Hours

Introduction : Definition and Characteristics of Computers, Stored Program Concept, History of Computers, Classification of Computers, Applications of Computers, Basic Organization of Computers.

Programming Basics & Overview of C: Definition of Programming, Problem Solving Techniques. Basics of Algorithm and Flowchart. Introduction to C, Basic Structure of C, Programming Examples.

Textbook-1: Chapter 1.1-1.6, Textbook-2: Chapter 3.1, 3.2, 3.7, 3.8, 3.9

RBT Levels: 1	
Module-2: Fundamentals of C.	8 Hours
C-tokens and Data types: Introduction, Character Set, Various C Tokens, Rules For Framing Variables, Data Types. **Control Statements:** Conditional and Unconditional Branching Statements With Programming Examples. Looping Statements (For, While and Do While) With Programming Examples. **Managing I/O Operations and Operators:** Managing I/O Operations, Formatted and Unformatted I/O Statements With Examples. Operators and Expressions. **Textbook -2: Chapter 4: 4.1-4.7, Chapter 5, 6 & 9, Textbook-1: Chapter 8.1- 8.13**	
RBT Levels: 1,2	
Module-3: Arrays and Strings.	8 Hours
Arrays: 1-Dimensional and 2-Dimensional Arrays (Declaration and Initialization), Reading and Writing of Arrays, Programming Examples on 1-D Arrays (Sorting: Bubble Sort, Selection Sort and Searching: Linear Search, Binary Search), Programming Examples on 2-D Array (Matrix Applications). **Strings:** Introduction to Character and String, Declaration and Initialization of String Variables, Reading Strings from Terminal, Writing Strings on to Screen. Various String Handling Functions, Programming Examples on Strings (With and Without Using String Handling Functions). **Textbook 2: Chapter 10 and 11, Textbook-1: Chapter 11.1- 11.4, 11.7, 11.8**	
RBT Levels:2,3	
Module-4: Functions and Pointers	8 Hours
User Defined Functions: Need For Functions, Types of Functions, Function Definition, Declaration and Its Scope, Category of Functions, Storage Classes (Automatic, Static, Extern, And Register). Recursive Function. Programming Examples. **Pointers:** Declaration and Initialization of Pointers, Accessing Pointer Variables, Pointer Arrays, Programming Examples on Pointers. **Textbook 2: Chapter 7, Textbook 1: Chapter 10: Chapter 13: 13.1-13.7**	
RBT Levels:2,3	
Module-5: User Defined Data Types (UDT) and Files.	8 Hours
UDT: Introduction to Structures and Unions, Definition, Declaration of Structures, Creating Structure Variables. Accessing Structures, Unions. Array of Structures and Programming, Pointer and Structures, Examples on Structures. **Files:** Introduction to Files, Types of Files, Opening a File, Closing a File, Read Data From Files, Writing Data to Files, Programming Examples. **Textbook 1: Chapter 14: 14.1, 14.3, 14.6 Chapter 15: 15.1- 15.4**	
RBT Levels:1,2,3	

III(b). PRACTICAL PART

Sl. No.	Experiments / Programs / Problems
1	Write a C Program to find i) Area of triangle when 3 sides are given ii) Simple Interest when P, T,R are given.
2	Write a C Program to calculate roots of quadratic equation when non-zero coefficients are given. Display all three roots with appropriate message.
3	An electricity board charges the following rates for the use of electricity: for the first 200 units **Rs.2.50** paisa per unit: for the next 100 units Rs.**3.00** per unit: beyond 300 units Rs **4.50** paisa per unit. All users are charged a minimum of Rs.100 as meter charge. If the total amount is more than Rs 500, then an additional surcharge of 15% of total amount is charged. Write a program to read the name of the user, number of units consumed and print out the charges.
4	Develop a C Program which simulate like a Simple calculator, using appropriate control statement.
5	Write a C Program to generate prime numbers up to a given range.
6	Compute sin(x)/cos(x) using Taylor series approximation. Compare your result with the built-in library function. Print both the results with appropriate message.
7	Develop C Program to sort the given set of N integer numbers, using Bubble Sort technique.

8	Implement matrix multiplication by validating the rules of multiplication.
9	Write functions to implement string operations such as string reverse, string concatenate without using string library functions.
10	Implement a structure to read, write and compute average- marks of the students, list the students scoring above and below the average marks for a class of N students.
11	Develop a C Program using pointers to compute Mean, Variance and Standard- Deviation of all elements stored in an array of N real numbers.
12	Write a C program to copy a text from a source file to destination file.

IV.COURSE OUTCOMES

CO1	Adopt the basic constructs of C language.
CO2	Make use of various controls statements.
CO3	Construct programming solutions using arrays and strings
CO4	Design programs using User Defined Functions and Pointers.
CO5	Select UDT and File concepts to solve simple programs.

V.CO-PO-PSO MAPPING (mark H=3; M=2; L=1)

PO/PSO	1	2	3	4	5	6	7	8	9	10	11	12	S1	S2	S3
CO1	2		1												
CO2	2		1												
CO3	2		2												
CO4	2		2												
CO5	2		2												

VI. Assessment Details (CIE & SEE)

General Rules: Refer CIE and SEE guidelines based on course type for autonomous scheme 2023 Dated on 10-02-2025.

Continuous Internal Evaluation (CIE): Refer Annexure section 2

Semester End Examination (SEE): Refer Annexure section 2

VII. Learning Resources

VII(a): Textbooks:

Sl. No.	Title of the Book	Name of the author	Edition and Year	Name of the publisher
1	Computer fundamentals and programming in C	Reema Thareja	3rd Edition, 2023	Oxford Unversity Press, New Delhi
2	Programming in ANSI C	E. Balaguruswamy	7" Edition	Tata McGraw- Hill

VII(b): Reference Books:

1	The 'C' Programming Language	Brian W. Kernighan and Dennis M. Ritchie	-	Prentice Hall of India
2	Computer Fundamentals & C Programming	Sumitabha Das	-	Mc Graw Hill Education

VII(c): Web links and Video Lectures (e-Resources)

1. elearning.vtu.ac.in/econtent/courses/video/BS/15PCD23.html
2. https://nptel.ac.in/courses/106/105/106105171/ MOOC courses can be adopted for more clarity in understanding the topics and verities of problem-solving method
3. https://tinyurl.com/4xmrexre

VIII: Activity Based Learning / Practical Based Learning/Experiential learning

- Activity Based Learning (Suggested Activities in Class)/ Practical Based Learning Quizzes
- Programming Assignments
- Seminar